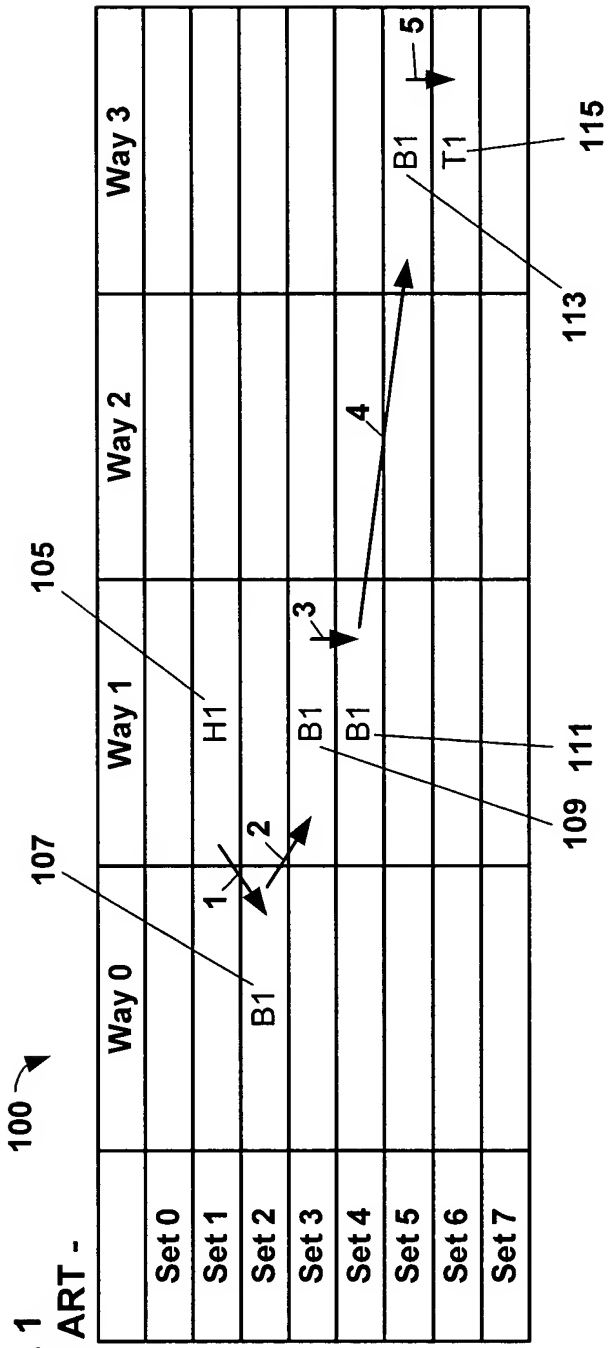


FIG. 1
- PRIOR ART -

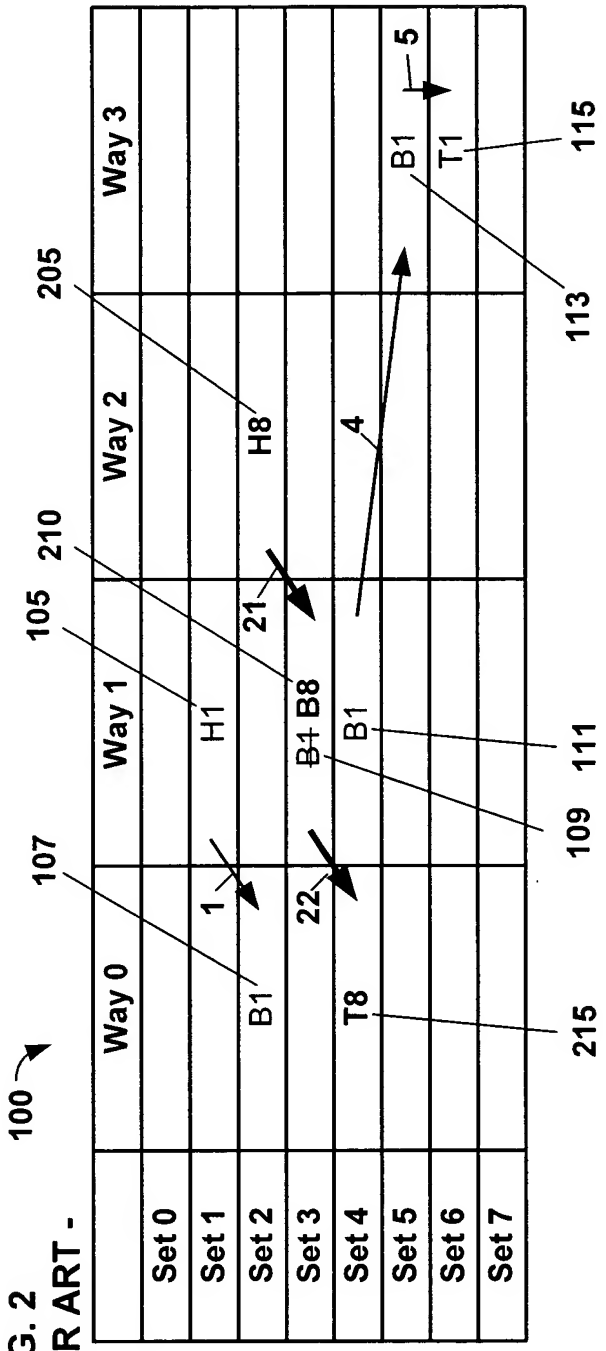


FIG. 2
- PRIOR ART -

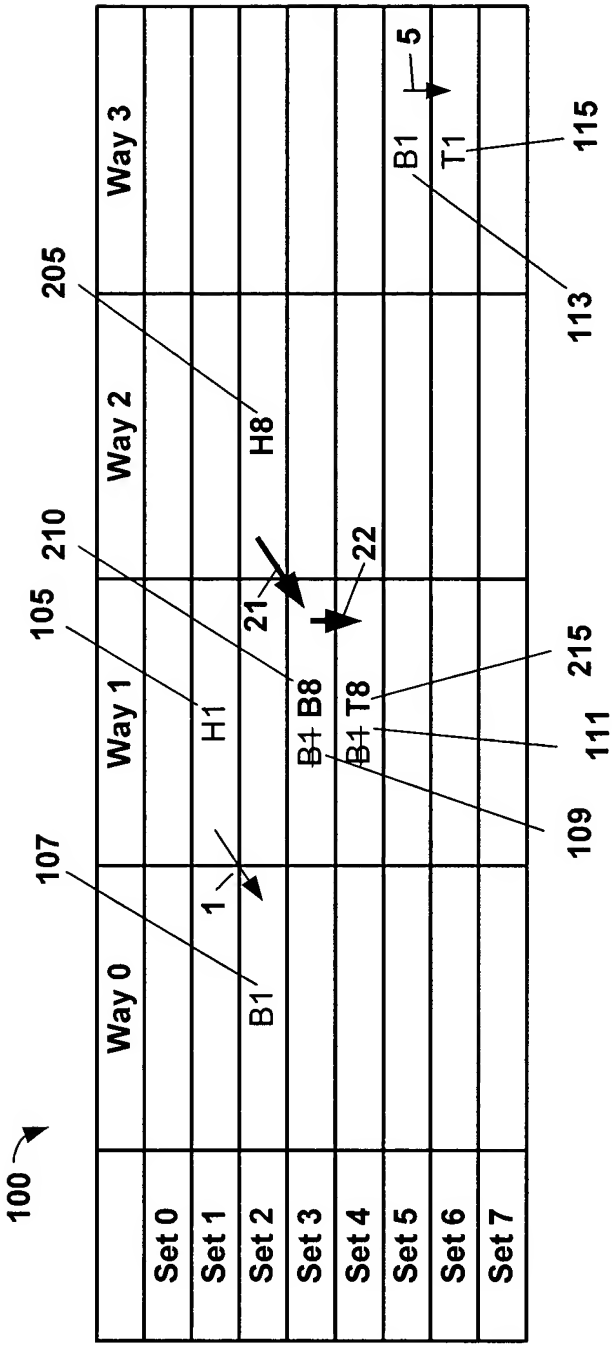

100
Way 0
Way 1
Way 2
Way 3
Set 0
Set 1
Set 2
Set 3
Set 4
Set 5
Set 6
Set 7
B1
H1
H8
B1 B8
B1 T8
B1
T1
1
21
22
5
107
105
210
205
215
111
109
113
115

FIG. 3

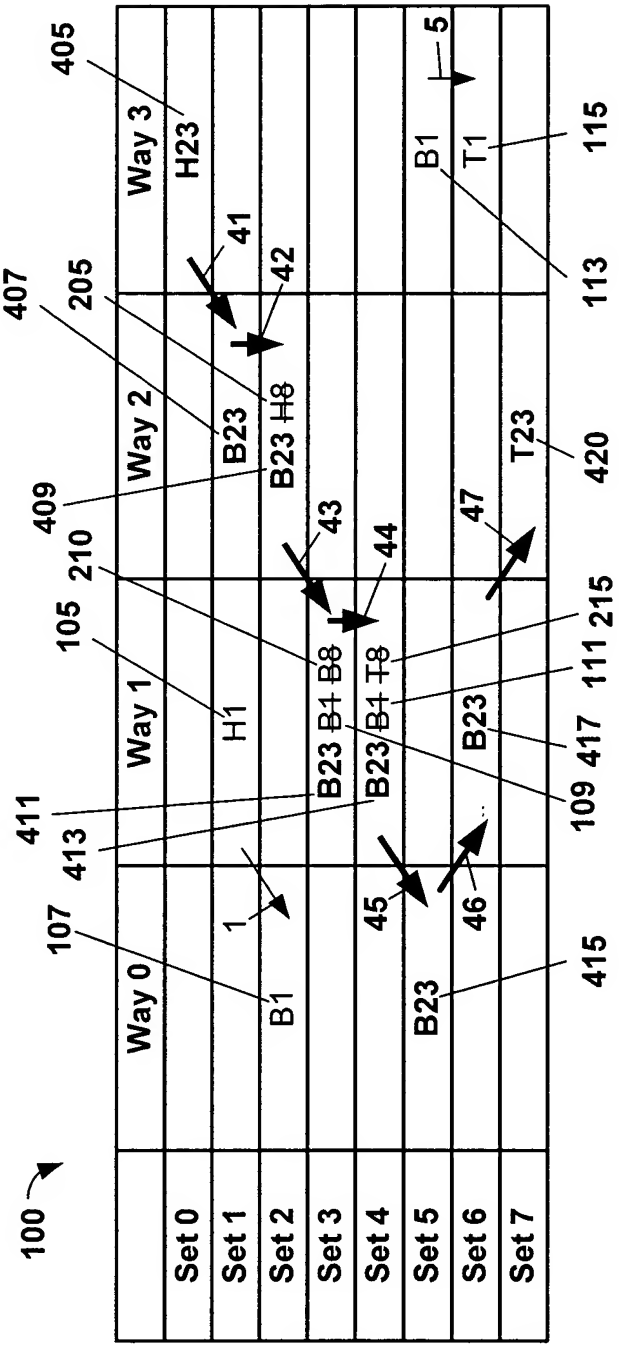
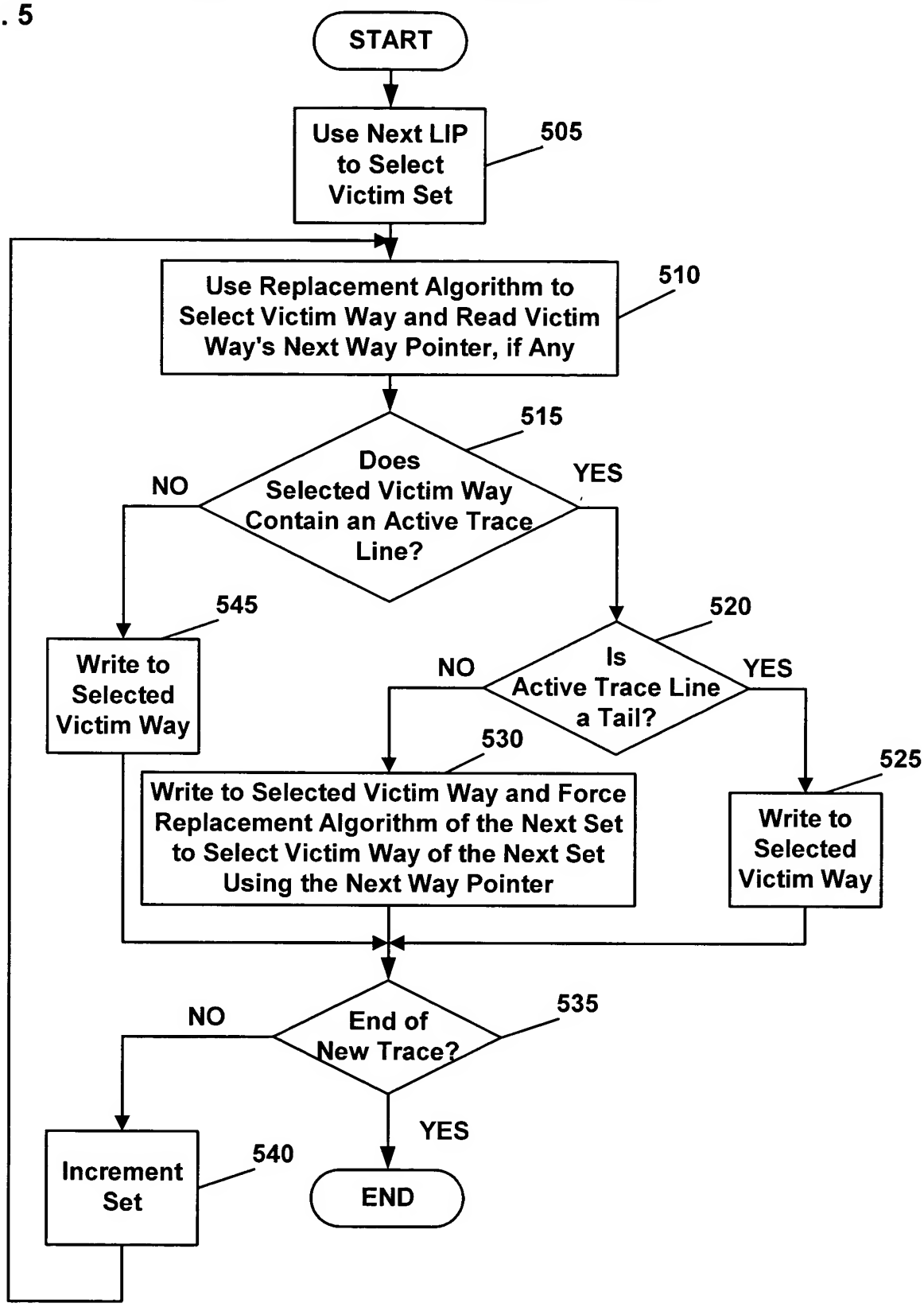

100
Way 0
Way 1
Way 2
Way 3
Set 0
Set 1
Set 2
Set 3
Set 4
Set 5
Set 6
Set 7
B1
H1
B23
B23 H8
B23 B8
B23 T8
H23
B1
T1
T23
B23
1
41
42
43
44
45
46
47
5
405
407
205
409
210
105
411
413
107
215
111
109
417
415
420
113
115

FIG. 4

FIG. 5


START
Use Next LIP to Select Victim Set
505
Use Replacement Algorithm to Select Victim Way and Read Victim Way's Next Way Pointer, if Any
510
Does Selected Victim Way Contain an Active Trace Line?
515
NO
YES
Write to Selected Victim Way
545
Is Active Trace Line a Tail?
520
NO
YES
Write to Selected Victim Way and Force Replacement Algorithm of the Next Set to Select Victim Way of the Next Set Using the Next Way Pointer
530
Write to Selected Victim Way
525
End of New Trace?
535
NO
YES
Increment Set
540
END

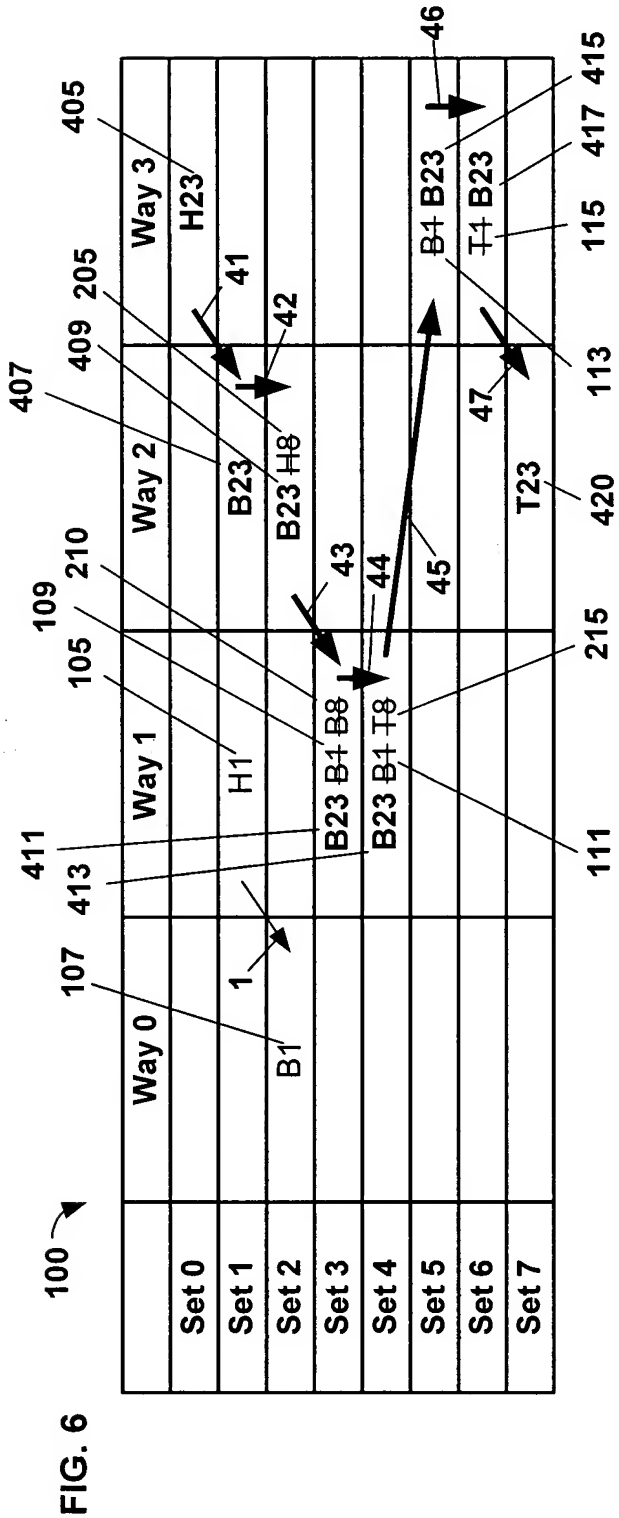

100
Set 0
Set 1
Set 2
Set 3
Set 4
Set 5
Set 6
Set 7
Way 0
Way 1
Way 2
Way 3
B1
H1
B23 B8
B23 B1 B8
B23 B1 T8
B23
H8
B1 B23
T1 B23
T23
1
41
42
43
44
45
46
47
405
407
409
205
210
109
105
411
413
107
415
417
115
113
420
215
111

FIG. 6

FIG. 7

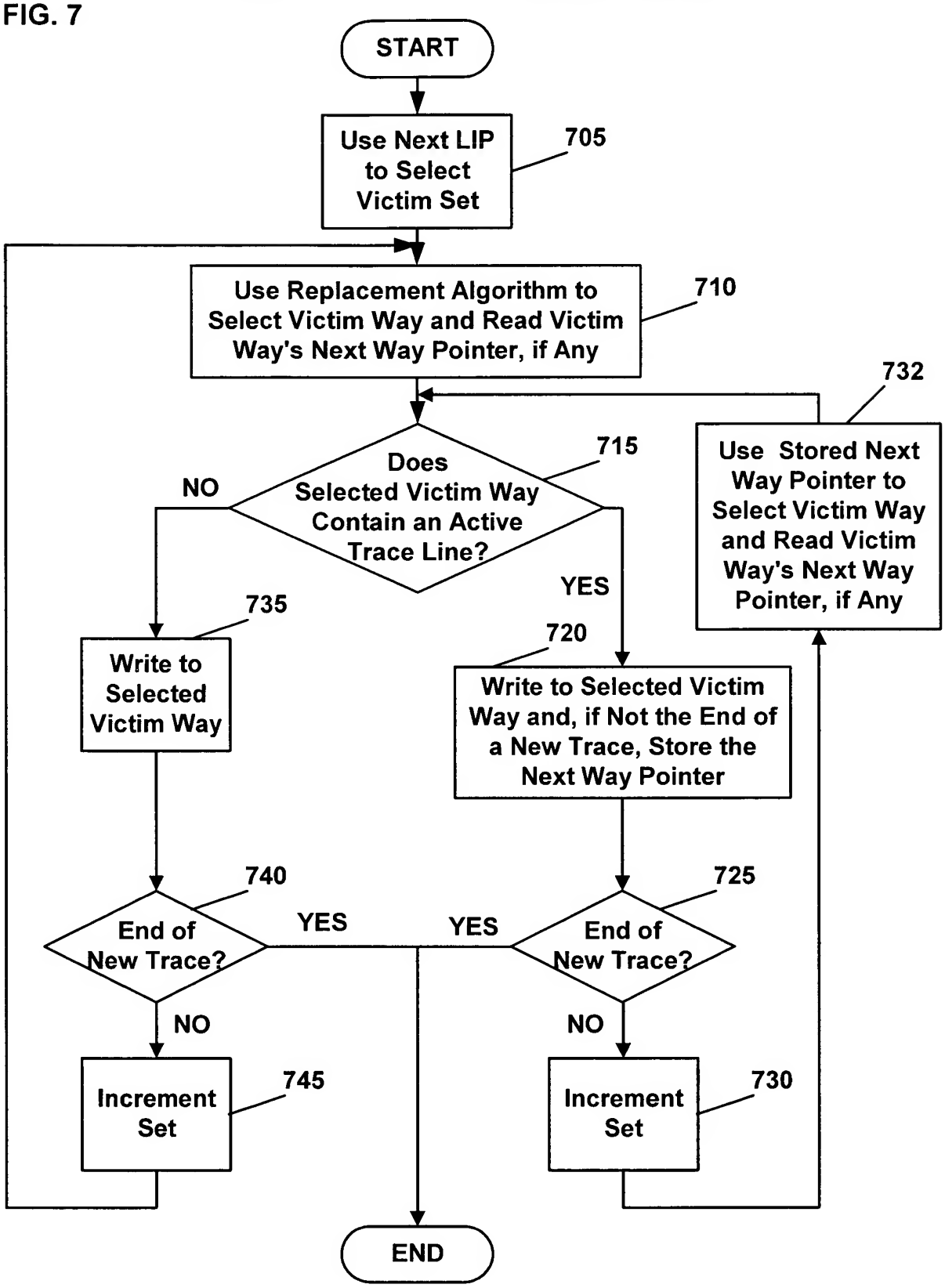

START
Use Next LIP to Select Victim Set
705
Use Replacement Algorithm to Select Victim Way and Read Victim Way's Next Way Pointer, if Any
710
732
Use Stored Next Way Pointer to Select Victim Way and Read Victim Way's Next Way Pointer, if Any
Does Selected Victim Way Contain an Active Trace Line?
715
NO
YES
735
Write to Selected Victim Way
720
Write to Selected Victim Way and, if Not the End of a New Trace, Store the Next Way Pointer
740
End of New Trace?
YES
YES
725
End of New Trace?
NO
NO
Increment Set
745
Increment Set
730
END

FIG. 8

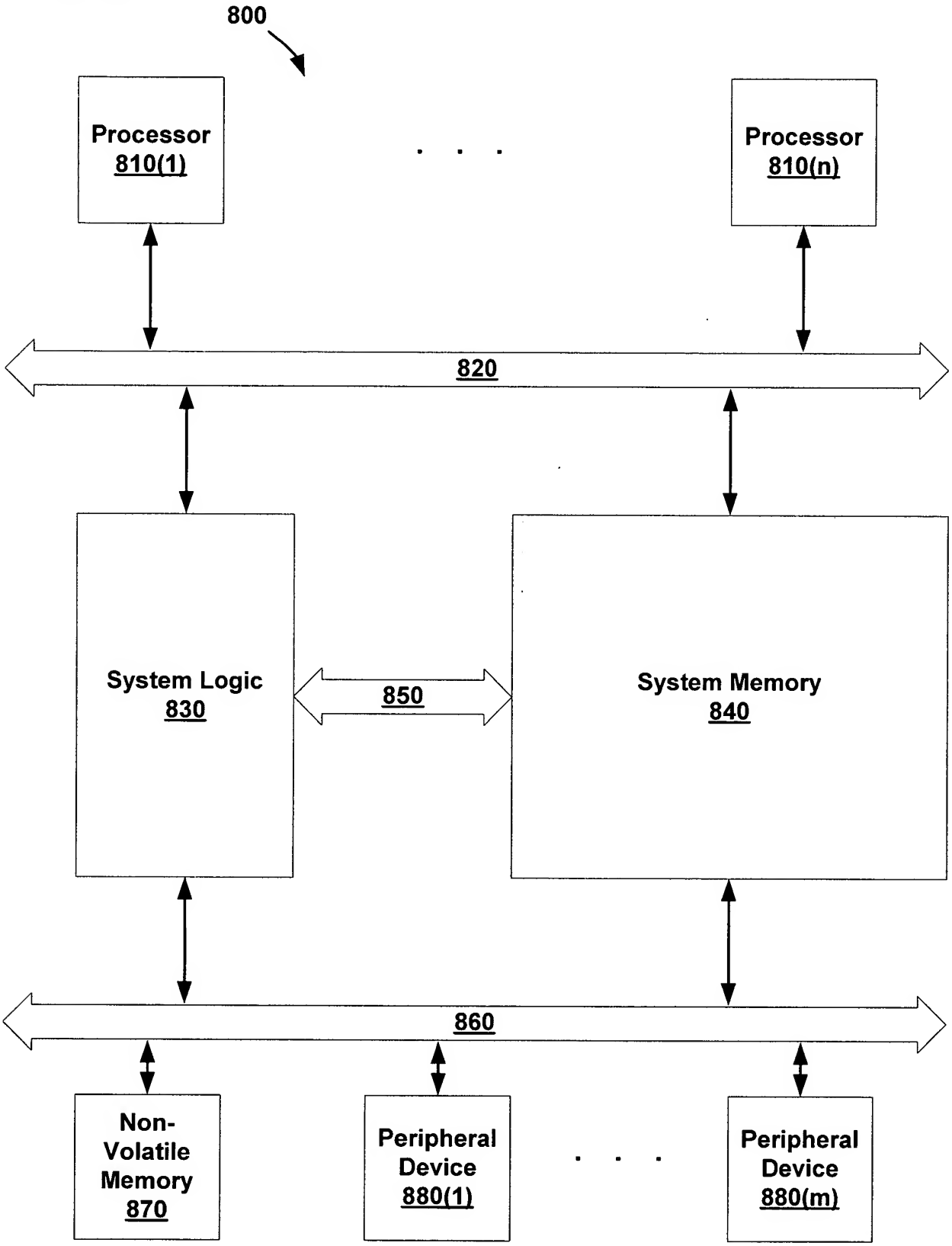
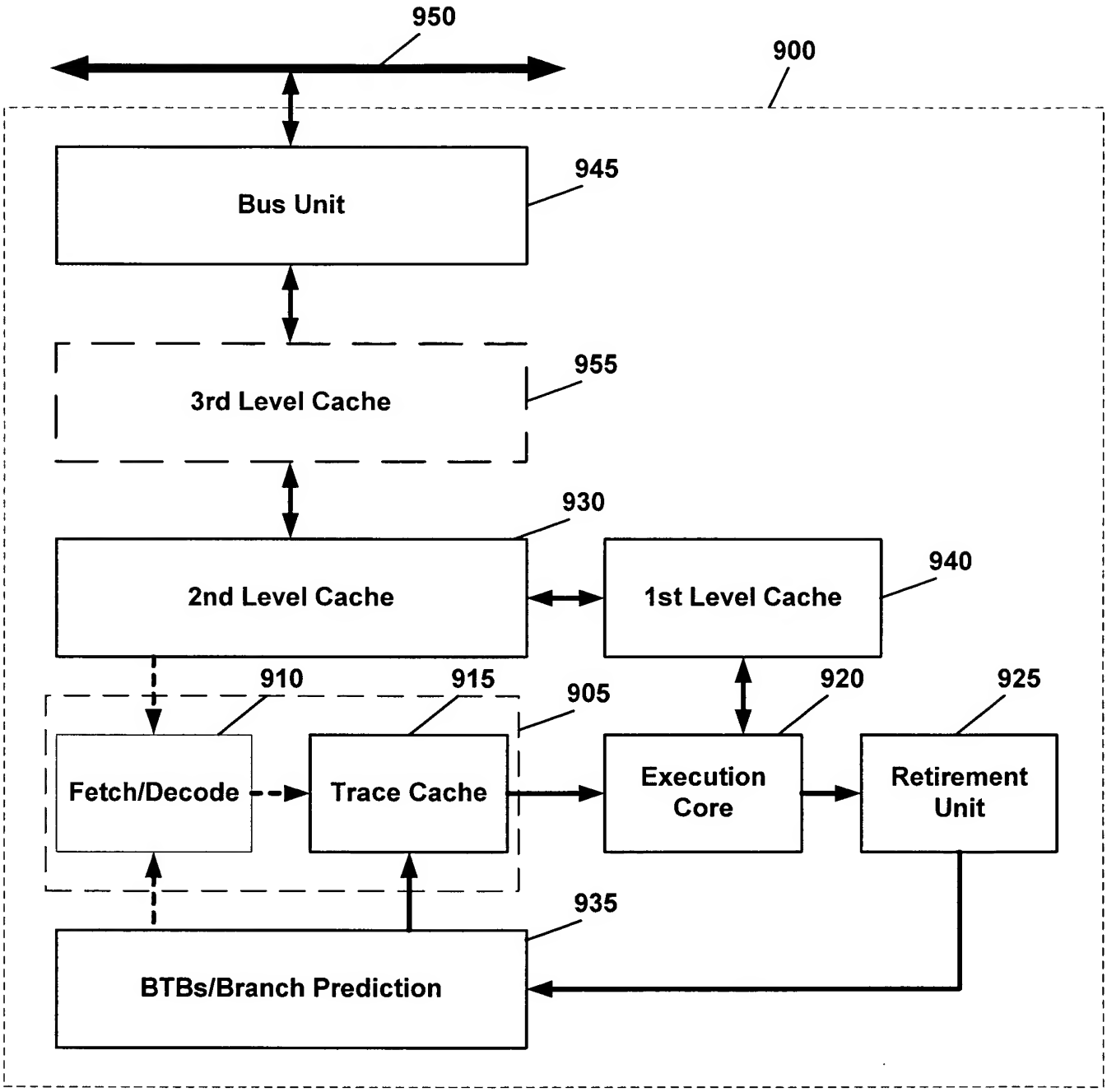

800
Processor
810(1)
Processor
810(n)
820
System Logic
830
850
System Memory
840
860
Non-
Volatile
Memory
870
Peripheral
Device
880(1)
Peripheral
Device
880(m)

FIG. 9


950
900
Bus Unit
945
3rd Level Cache
955
930
2nd Level Cache
1st Level Cache
940
910
915
905
920
925
Fetch/Decode
Trace Cache
Execution Core
Retirement Unit
935
BTBs/Branch Prediction